



THE “LOW CARB CRAZE” AND CURRENT FAD DIETS

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Although low-fat diets have been the standard recommendation for weight reduction, fat intake among the United States population has decreased during the last 20 years while the number of individuals who are obese has increased to epidemic proportions. In addition, obesity-related chronic conditions such as cardiovascular disease and diabetes have also dramatically increased.¹ The US Department of Agriculture's Food Guide Pyramid Diet is a high-carbohydrate, low-fat diet that advocates consumption of grains, fruits and vegetables at the expense of fat. Low-carbohydrate, high-fat diets (e.g., Atkins Diet, Zone Diet, South Beach Diet) have gained increasing popularity despite neither sufficient evidence about their long-term effectiveness or safety, nor clear consensus as to what amount of carbohydrates per day constitutes a low-carbohydrate diet.² This editorial presents the current evidence-based research findings regarding low-carbohydrate, high-fat diets.

The Atkins Diet focuses on the consumption of fat and protein as primary caloric energy sources, while severely restricting carbohydrates.³ The Atkins Diet claims to be effective at producing weight loss despite ad libitum consumption of fatty meat, butter, and other high-fat dairy products, restricting only the intake of carbohydrates to fewer than 30 grams per day.⁴ The Zone Diet is another new fad in low carbohydrate dieting. The Zone is a 40% carbohydrate, 30% protein and 30% fat eating plan that advocates only sparing use of grains and starches and a precise 0.75 protein to carbohydrate ratio required with each meal.⁵ Similar to the Atkins Diet, the South Beach Diet begins with a two-week ban of fruit, bread, potatoes, baked goods, sweets, cookies, ice cream and alcohol, with subsequent stages that permit adding back foods while supposedly maintaining initial weight loss. The South Beach Diet claims to differ from Atkins by pushing the “right carbs” instead of no carbs. The South Beach diet allows meat, but unlike Atkins, it warns against saturated fat and encourages consumption of fish and chicken.⁶ One hypothesis for the accompanying weight loss observed with these low-carbohydrate, high-fat diets may be that severe restriction of carbohydrate intake leads to depletion of glycogen stores, excretion of glycogen-bound water, and a resultant ketogenic state that is appetite suppressing.⁷

Large randomized controlled trials have shown that reduction of fat intake as part of a healthy lifestyle reduces the risk of overweight and type 2 diabetes.⁸ Other randomized controlled trials have shown that low-fat diets for overweight or obese individuals are as efficacious as other weight-reducing diets for achieving sustained weight loss.⁹

Both low-fat, low-calorie diets and low-carbohydrate, high-protein diets have been shown to have a favorable impact on serum lipids. Low-carbohydrate diets, however, limit fresh fruit and vegetable intake and are seriously deficient in several micronutrients and dietary fiber, thus creating a need for nutritional supplements.¹⁰

The ketogenic diet is a high-fat, low-carbohydrate, adequate-protein diet that has been used for more than eight decades in the treatment of intractable seizures in epileptic children. The effects of the ketogenic diet on brain biochemistry, neuron function and cellular network behavior still remain unclear.¹¹ Although no reliable evidence from randomized controlled trials supports the use of ketogenic diets for people with epilepsy, for those on multiple antiepileptic drugs, with a difficult epilepsy, the ketogenic diet is a possible treatment option.¹²

Insulin resistance is a central pathogenic factor for the metabolic syndrome. The metabolic syndrome is a cluster of conditions, including high levels of blood pressure, blood sugar and cholesterol, and abdominal obesity, which together greatly increase the risk of cardiovascular disease and type 2 diabetes.¹³ In the context of the current obesity epidemic, it is imperative to consider diets in terms of their ability to promote weight loss as well as ameliorate insulin resistance.¹⁴

Carbohydrates are classified by their glycemic responses or postprandial (i.e., post meal) blood glucose levels using the glycemic index.¹⁵ Diets with a high-glycemic index or load may affect insulin-resistant and insulin-sensitive individuals differently. The total amount of dietary carbohydrates, their associated glycemic responses or indices, and an individual's physical activity level must all be considered in diet comparison.^{16,17} Although long-term research on glycemic index and weight regulation is needed, evidence suggests that consumption of low-glycemic index carbohydrates may delay the return of hunger and subsequent energy intake relative to consumption of higher-glycemic index carbohydrates.¹⁸

Postprandial hyperglycemia plays a direct pathogenic role in the disease process. Low-carbohydrate ketogenic diets lead to weight loss and favorable changes in serum triglycerides and high-density lipoprotein (HDL) cholesterol or “good cholesterol”.¹⁹ Evidence suggests that a low-glycemic index diet may protect against type 2 diabetes, cardiovascular disease, obesity, colon cancer and breast cancer.²⁰ Further studies are needed to delineate the role of glycemic carbohydrates and their mechanisms of action in satiety determination and chronic disease prevention.²¹

A randomized clinical trial, funded by the National Institutes of Health, is evaluating the safety and effectiveness

of low and high carbohydrate diets in a four-year study of 360 overweight and obese male and female subjects, 18 to 65 years of age. Each participant will be enrolled in the study for two years. This is one of the first long-term studies comparing the conventional USDA diet (high-carbohydrate, low-fat) to one of the low-carbohydrate, high-fat diets, the Atkins Diet. Each of the dietary approaches will be evaluated on changes in 1) weight and body composition; 2) metabolic and organ function; and 3) exercise tolerance. This study, to be completed in May 2007, will provide valuable insight into both the short- and long-term clinical effects of a low-carbohydrate diet and a high-carbohydrate diet in overweight and obese men and women.

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